KANSAS CITY MISSOURI

Climate Action Roadmap

TABLE OF CONTENTS

List of Figures and Tables

EXECUTIVE SUMMARY

In the face of future uncertainty around climate change, Kansas City has decided to act proactively to examine impacts in terms of annual greenhouse gas (GHG) emissions and develop plans to respond appropriately. This Climate Action Roadmap builds on the most recent GHG inventory to provide response strategies in keeping with goals the City has set. Realizing the benefits of emissions reductions will not only make the City a healthier place that is well-prepared for the future, but can save money and encourage new industry as well. The City has set a goal to reduce emissions 30 percent from 2000 emissions levels by 2020, and 80 percent by 2050, both of which will require ambitious efforts. In order to reach these goals, a diverse set of strategies will have to be deployed—ranging from increasing the use of renewable energy to cultivating a more robust urban forest.

The recently completed 2013 GHG Inventory provides a point-in-time snapshot of where GHG emissions are coming from, and also serves as the basis for this roadmap. The bulk of the Kansas City community's GHG emissions are from electricity consumption. Consequently, focusing on a cleaner energy supply and using less electricity are the two most impactful areas for the community to focus if it wants to reduce emissions.

Through examination of the 2013 inventory, the previously completed inventory in 2005, and external factors such as population growth, clear trends led to the development of a forecasted model of future emissions growth. City operations have led the way in reduction efforts to date, with a significant decline in overall emissions that is ahead of the 2020 goal. Community-wide, overall emissions increased, then decreased to pre-2000 levels by 2013, though still higher than required to be on track to meet the 2020 goal. In order to accelerate emissions reductions for the community, the strategies in this roadmap lean towards aspirational rather than pragmatic, in order to initiate conversation about how the City can continue towards its goals. This roadmap illustrates what is needed to achieve the goal of 30 percent reduction in community emissions by 2020, and given the compressed timeframe to achieve it, most strategies represent very aggressive implementation. Selected strategies were informed by best practices, opportunities identified in the inventory, City staff, and ongoing and completed efforts to date. In order for the strategies to become truly actionable, they will need to be vetted by the community to see which measures are most palatable and then analyzed again in more detail to create specific implementation plans.

Kansas City's sustainability efforts will be complemented by this technical analysis of how to close the gap between business-as-usual and goal achievement. Each of the potential strategies identified includes an overall reduction target, plus a number of supporting tactics to help achieve the goals. Where applicable, the strategies also include a cost benefit analysis that looks at direct costs and savings–the most directly quantifiable outcomes. Myriad co-benefits such as health benefits and economic development may also result from individual strategies, but are not included in this

analysis. The potential tactics described in each strategy can be refined as the community dialogue evolves, and further analysis will likely reveal additional synergies and opportunities. In addition, technological and social change are powerful agents that in general, are not considered in this modeling effort. While such factors cannot be relied upon, they can certainly be leveraged to help meet goals.

Kansas City has a solid foundation in place and is poised to realize the benefits that are associated with GHG reductions. Taking the next steps of developing and enhancing programs to target the biggest opportunities will position the community to lead well into the future. Using this roadmap as an aspirational vision of those next steps necessary to meet the goals will enable a sense of what a fully committed effort would look like, so that the City can decide how to allocate resources.

1 INTRODUCTION AND BACKGROUND

1.1 Kansas City Profile

On August 17, 2006 the Mayor and City Council passed a resolution to join more than 300 local governments in the United States and 770 local governments worldwide in reducing greenhouse gas (GHG) emissions. The City Council charged the City Manager and Chief Environmental Officer to work with the community and an 11-member steering committee in developing a Climate Protection Plan . As part of this plan, the following goals were established:

- Reduce City government GHG emissions by 30 percent below 2000 levels by 2020
- Reduce community-wide emissions 30 percent below 2000 levels by 2020 and 80 percent by 2050

1.2 Climate Change and Greenhouse Gases

Climate change refers to the wide range of impacts from the increase in accumulated concentrations of GHGs in the atmosphere as a result of human activity. Climate disruption is one of the most serious challenges facing the world today. Globally, these impacts include changes in temperature, precipitation, sea level, ice melt, frequency and severity of storms, and changes to species and habitats–all of which ultimately affect human health and economic vitality. Specifically, the Kansas City region is expected to see increases in temperatures, particularly during summer months, as well as moderate increases in spring and winter precipitation as a result of global climate change.

To protect the health and economic well-being of current and future generations, GHG emissions must be reduced through a variety of methods. The potential benefits for Kansas City are tangible. Cities that take action are saving millions of dollars while boosting real estate values, attracting new jobs and businesses, and improving livability. Investments in mass transit and commitments to clean energy sources, healthier air quality, and new partnerships with the private sector all result in greater economic prosperity for residents. They make a community a cleaner, safer, and more desirable place to live. The analysis for this roadmap looks at direct benefits only in terms of direct cost savings and emissions reductions, but the less easily quantifiable benefits are what will ultimately impact the City most substantially in the long term.

1.3 Accomplishments to Date

Kansas City has been working over the past 10 years to reduce energy use and GHG emissions. A few programs are already in place and are listed below. Additional details

about what the City is doing to address energy, water, waste, and land use can be found in the 2013 Sustainability in Kansas City report.

- **Energy Works KC**: An initiative that informs home and business owners on ways to reduce energy use through energy assessments, upgrades and financing.
- **City Energy Project**: A 3-year initiative to promote energy efficiency in large commercial and institutional buildings. Kansas City is one of 10 cities nationwide selected to participate.
- **Energy Data Accelerator**: A 2-year initiative, in partnership with KCP&L and US Department of Energy (DOE), to define local best practices to aggregate energy use data in multi-metered buildings in preparation for energy use benchmarking.
- **Alternative Fuel Fleets:** Kansas City has more than 345 vehicles operating on compressed natural gas, propane, or electricity.
- **Bike KC:** A plan to develop a transportation network, including 600 miles of on-street bicycle facilities.

To help measure the impact of these and other programs in the community, an update to the government operation and community-wide GHG emissions inventories was conducted for 2013. The results of this update are presented in Chapter 2.

1.4 The Roadmap Framework

The City's 2013 GHG inventory update and the current activities identified above are all important steps in making and tracking progress toward emissions reduction goals for both government operations and community activities. This Climate Action Roadmap is intended to help identify additional emission reduction opportunities for the Kansas City community. This roadmap will look to the City's existing Climate Protection Plan for guidance and provide an update to that plan that encourages climate action and implementation of emissions reduction strategies in the Kansas City community.

As a City, the majority of emissions are not in the direct control of local government. These emissions come from residences, businesses, industry, visitors to Kansas City, as well as from local government. The inventory divides community emissions by scope which indicates which emissions occur directly in Kansas City (Scope 1), which occur outside the community because of electricity purchased for use in the city (Scope 2), and which occur outside the community because of demand generated within Kansas City, such as airline travel and vehicle trips to/from the community (Scope 3). In order to address this wide variety of emission sources and parties involved, the possible strategies considered in the roadmap employ a number of mechanisms (e.g., incentives, education, lobbying, and regulation) and many will require the involvement of local government, private business, citizens, and even entities outside Kansas City to be implemented successfully.

1.5 Analysis Methods and Assumptions

In order to develop this type of roadmap, extensive analysis of existing datasets occurred, and numerous assumptions were made. The roadmap data uses a less rigorous approach to data accuracy than the inventory due to the fact that the inventory was based on existing data, while the roadmap is based on assumptions of future activity. As Kansas City moves forward with additional planning and implementation for any of the strategies, refinement to the assumptions will need to be considered.

Individual strategies were examined based on a combination of direct experience, verified results, and reasonable assumptions. Data sources ranging from the National Renewable Energy Lab (NREL) to individual municipalities were consulted and the general strategy assumptions were vetted with the help of City staff and other stakeholders. In many cases the assumptions were further refined in order to present a scenario and package of strategies that achieves the 2020 emissions reduction goal. Then, the information was modeled to determine what an achievable level of emissions reduction would be over time, informed by various assumptions such as program start-up and likely penetration rates, in order to provide scenarios that meet the 2020 goals and provide basis for continued discussion.

1.6 Collaboration with Johnson County, Kansas

Unlike past efforts for Kansas City, this update was conducted in conjunction with Johnson County, Kansas. This collaboration has allowed both jurisdictions to streamline the data collection process and realize efficiencies that would have been missed if the updates had been conducted independently. Since many of the energy utilities serve both jurisdictions, the project team was able to coordinate data requests and share results.

Additionally, recognizing Kansas City and Johnson County are both part of the larger nine-county Kansas City metropolitan area, the partnership was a natural fit. This collaborative effort will launch further sustainability efforts that will maximize economic, environmental, and societal prosperity in the Kansas City region.

2 CURRENT CIRCUMSTANCES – THE INVENTORY

The completed GHG inventory for Kansas City serves to provide a benchmark of where emissions measured in 2013, help calibrate the models used for predicting future performance, and ensure accuracy of previous efforts. While a number of informative conclusions were drawn from the inventory, the overall picture that emerged is one where the efforts of the City have resulted in ongoing reductions of emissions for City operations and a decrease in emissions community wide since 2005. The following provides a brief summary of the 2013 inventory update, for a more comprehensive review refer to the complete Kansas City Missouri (KCMO) GHG Inventory – 2013 Update report.

2.1 Government Operations Inventory

This inventory includes emissions from all operations, facilities, and sources the City owns or leases. Where possible, the data have been organized by department for easy comparison.

The emissions generated from government operations in Kansas City in 2013 totaled 287,000 $MTCO_2e$. This is equivalent to all 4,500 City employees commuting across the state from Saint Louis every work day. As shown in the figure below, from 2000 to 2005 the City saw a 4.7 percent decrease in government operations GHG emissions–equal to a .9 percent reduction annually. Since 2005 emissions have decreased an additional 21.6 percent for an average of 1.9 percent per year, just over a 25 percent reduction in total emissions since 2000, ahead of target for what is required to achieve a 30 percent reduction by 2020.

Water Services and Public Works (which includes streetlights and traffic signals) combined accounted for almost three-quarters of all emissions inventoried for Kansas City operations in 2013.

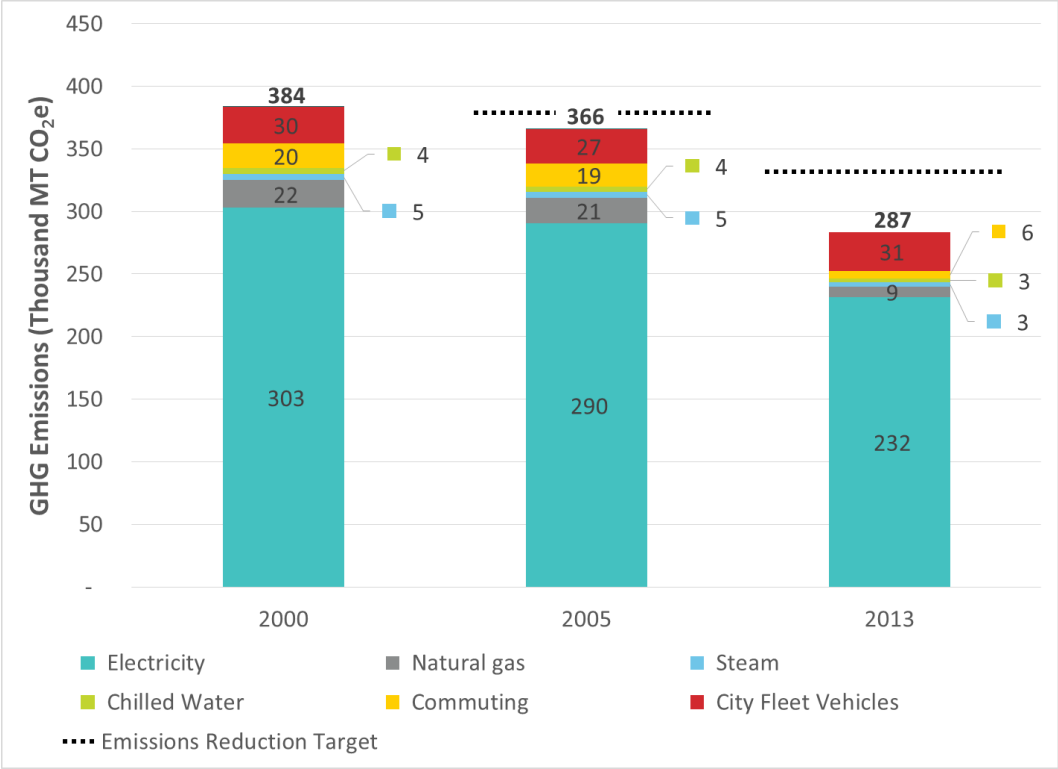


Figure 1. Kansas City Operations GHG Inventories 2000-2013

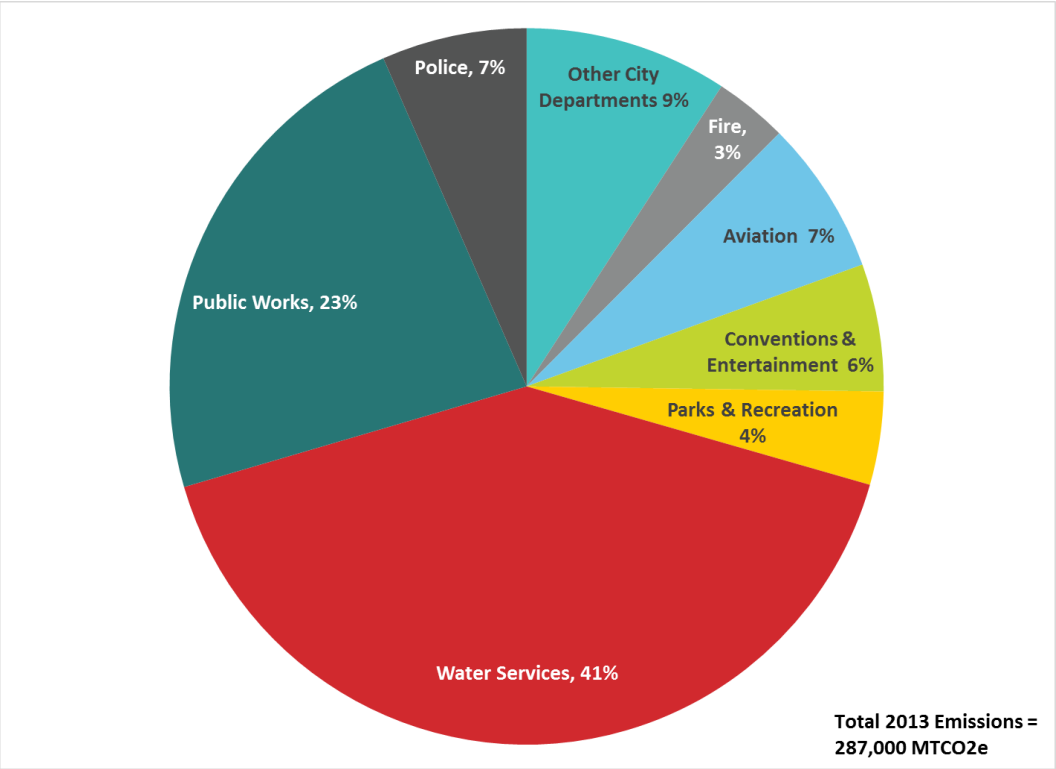


Figure 2. Kansas City Operations GHG Emissions by Sector- 2013

2.2 Community-wide Inventory

The inventory uses the Kansas City jurisdictional boundary as the organizational boundary–this includes GHG emissions from sources within the City's jurisdiction as well as trans-boundary sources associated with activities within the community boundary.

The emissions generated community-wide in Kansas City in 2013 totaled 10.4 million $MTCO_2e$. This is equivalent to every resident driving one way from Kansas City to Jefferson City, Missouri, every day of the year. To sequester this amount of carbon would require covering one-fifth of the land area of the state of Missouri with trees.

From 2000 to 2005 Kansas City saw a 4.5 percent increase in community-wide emissions–an increase of 0.9 percent annually. Since 2005, the community has seen an annual decrease of 1 percent, resulting in a total decrease in emissions of 3.8 percent over the 2000 baseline.

In addition, emissions per capita decreased from 24.6 to 22.4 $MTCO_2e$ per capita. This indicates the community has made efficiency improvements so that the emissions impact of each new resident is less than in prior years. While trending the right direction, more aggressive initiatives will have to be implemented to achieve Kansas City's emissions reduction goals.

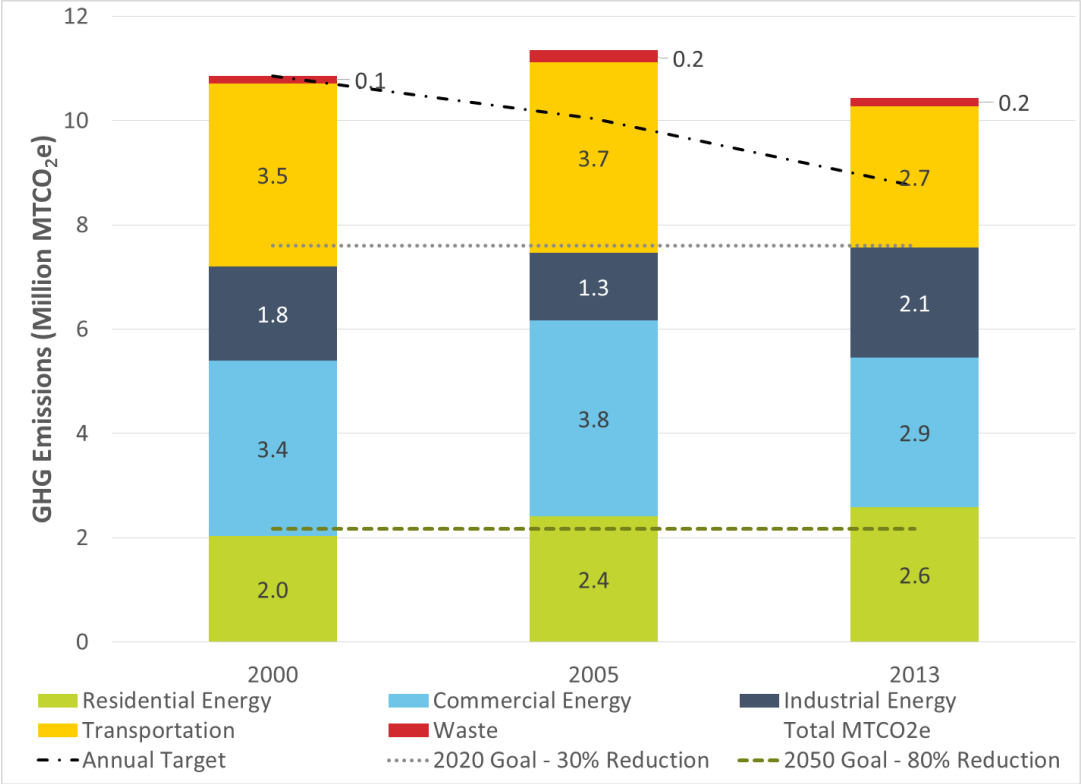


Figure 3. Kansas City Community GHG Inventories 2000-2013

3 FUTURE CIRCUMSTANCES – THE FORECAST

3.1 Business-as-Usual Forecast

A Business as Usual (BAU) inventory forecast was prepared for Kansas City from 2013 to 2050. This forecast is based on emissions today and does not account for reduction efforts in progress in Kansas City, those that may be implemented in Kansas City over the coming years, nor those that will occur as a result of changes in state or federal standards, such as increases in fleet fuel efficiency or likely reductions in the emissions intensity of electricity.

Emissions from most sources in the inventory are projected to grow at the rate of population growth in Kansas City from 2013 to 2050 (estimated at 0.5 percent).

3.2 Emissions Reductions

The completed roadmap also includes a forecast of future emissions under the series of recommended strategies in the following section. The established goals for GHG emissions are aggressive, and the recommended strategies demonstrate the substantial action needed to close the 2020 gap and achieve the City's community-wide reduction target. The forecast and associated recommended strategies demonstrate an attempted balance of pragmatism and aspiration, tilted towards aspiration in order to represent a direction forward that the City can use to not only maintain ongoing emissions reductions but reach for national leadership. The current emissions reduction forecast demonstrates a 30 percent overall reduction in emissions by 2020 relative to a 2000 baseline and a 59 percent reduction by 2050, relative to the same baseline. This roadmap acknowledges that there is still a gap to achieving the 2050 goal that would need to be filled with continued advancements in technology and ideas between now and mid-century.

The recommended strategies fall into three broad topic areas, which are discretely identified below in order to illustrate their relative contribution to the overall GHG reductions. The graph also illustrates the strategies to reach the City's 2020 emissions reduction goal. Emissions reductions are labeled in units of million metric tons of CO2 equivalents, and demonstrate an increase from 10.9 million in 2013 to 11.3 million under a business as usual scenario in 2020 and then dropping to the 30 percent reduction goal of 7.6 million with the full implementation of the roadmap strategies. Those emission reductions consist of roughly 65 percent from improvements in energy supply, 25 percent from energy efficiency, and the remainder roughly split between transportation emissions reductions and other measures.

Figure 4. Emissions Reduction Forecast by Strategy/Focus Area

It is important to note that a number of emissions reductions are included in the analysis that are not directly led or implemented by Kansas City. Federal standards such as the Corporate Average Fuel Economy (CAFE) standards for vehicular fuel efficiency improvements, and the efforts of the EPA to reduce the carbon intensity of power plants will have significant effects on the emissions inventory for Kansas City. Those strategies are included in the emissions reductions illustrated in the graph above to demonstrate their impact, but they are omitted from the cost-benefit portion of the analysis.

3.3 Cost –Benefit Analysis

Quantifying the benefits of GHG emissions reductions is an inherently complicated effort. As mentioned above, cities are seeing myriad benefits including direct cost savings and distributed economic and social benefits for all residents. There are also environmental benefits, and long term planning benefits such as risk mitigation, urban vibrancy, and utilization of existing infrastructure. While such complex effects of GHG reductions are important, quantifying them in an accurate manner requires a degree of analytical complexity that is beyond the scope of a roadmap framework. The metrics examined in this roadmap include emissions reduction potential, implementation cost, direct cost savings, and cost effectiveness by 2050 in terms of net cost/savings per metric ton of CO_2e reduced. The direct net cost or savings from the strategies is illustrated below, with

an indication of not only the annual cost or savings but also a cumulative cost/savings trend line indicating when the strategies would be expected to break even and start accruing a direct financial return. With the current model, the sum of the project savings would outpace their costs starting in approximately 2032.

All costs and savings are presented in Net Present Value (NPV) assuming a discount rate of 5 percent to account for the time-value of money as well as a level of uncertainty for the investments. Additionally, nominal escalation rates were applied to all fuel costs to account for future price increases. All escalation rates were taken from the Energy Information Administration.

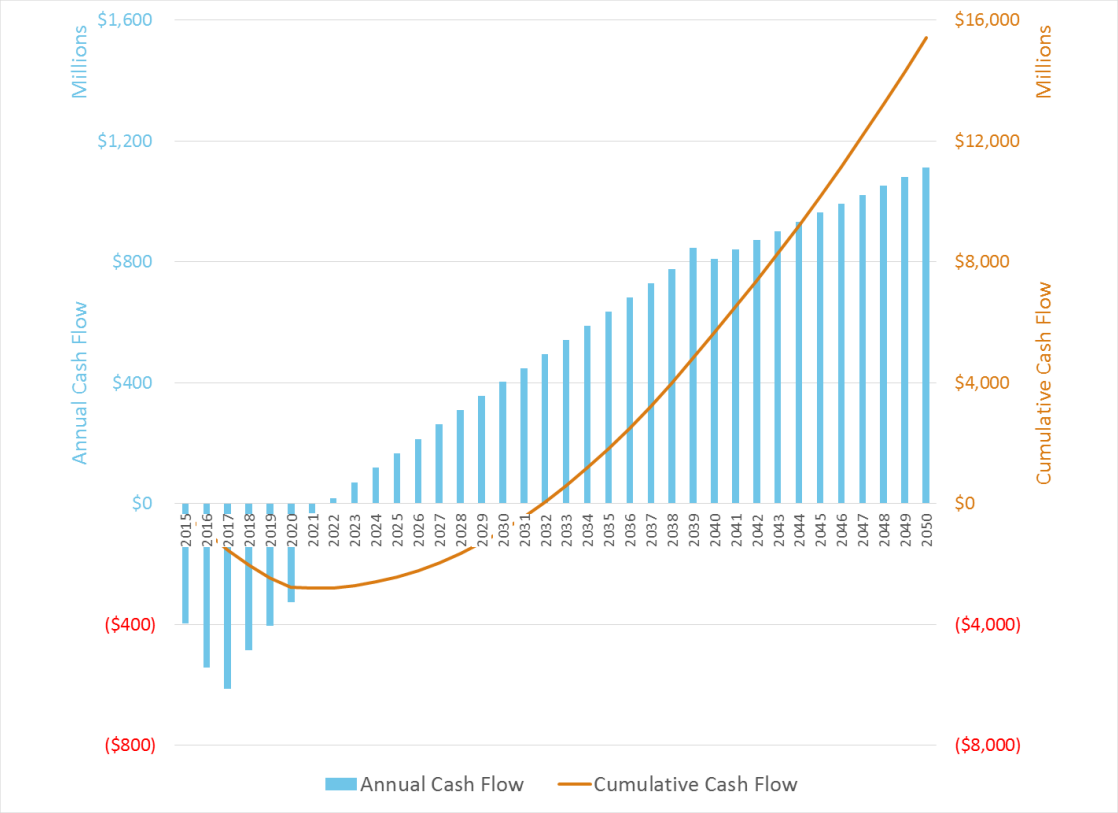


Figure 5. Roadmap Cash Flow Analysis

The majority of the cost savings are generated from reductions in energy use and commensurate decreases in utility spending. Because the many other benefits (as well as some potential costs) are not included, it is important to recognize that the cost analysis is a simplified version of the full economic impacts and should not be taken as a literal representation of either total costs or benefits.

Not only will a number of benefits accrue to the City that are not captured with simple direct costs, but the payback rate of the overall plan increases significantly over time. While there may be higher costs associated with capital expenses, program ramp-ups, and market entry points, these strategies have been selected for overall effectiveness. As an ongoing and dynamic process, there will be regular evaluations to determine what is working well and what might not be living up to expectations.

Since the focus is on short term costs and benefits as well as long term, the individual recommended strategies have costs and benefits included for both 2020 and 2050. As a City, there is an inherent balance and an ability to think both short and long term about finances, and this report attempts to respect both of those timescales. To attempt to capture to some degree the complexity of factors a City must weigh in the decision making process, the following graph illustrates the net cost or savings of a particular strategy compared to its emissions reduction potential. Several strategies were omitted from the graph due to either lack of financial costs directly associated with City efforts such as Utility Scale Clean Energy or because as part of the Other category there were other mitigating reasons that are further explained in the individual strategies.

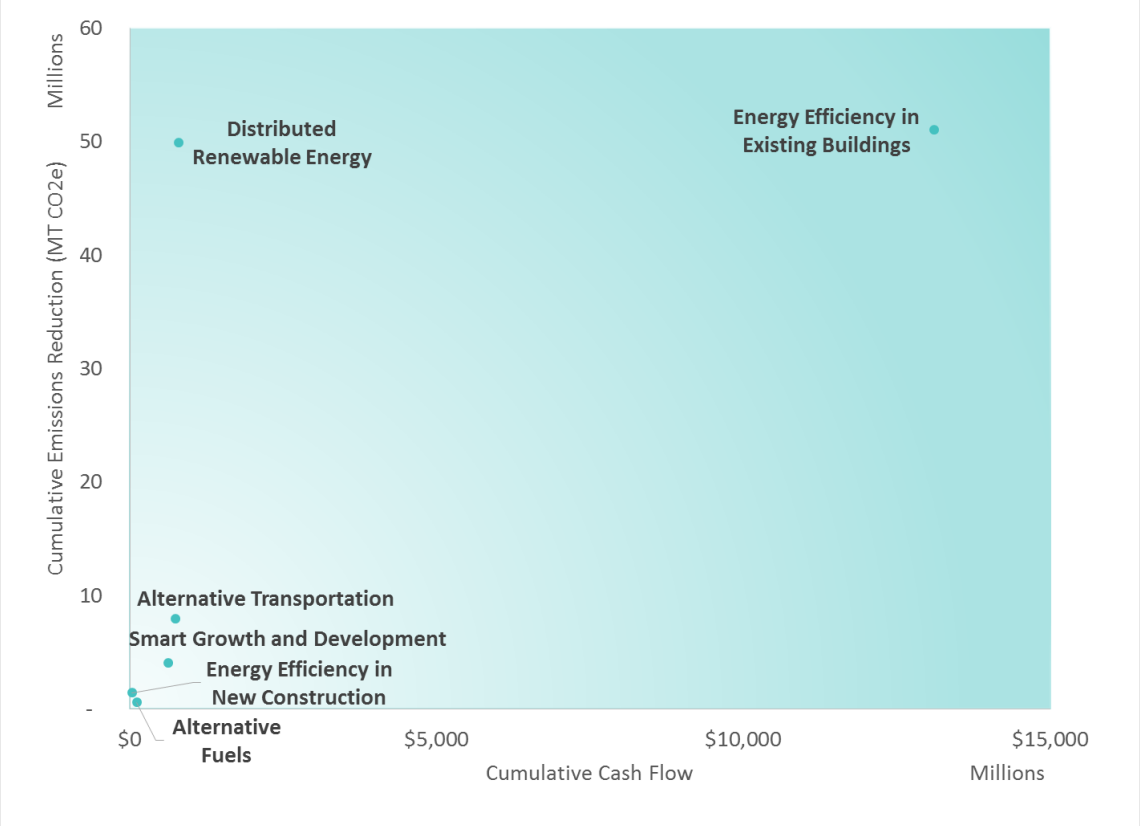


Figure 6. Cost and Environmental Effectiveness by Strategy

4 POSSIBLE REDUCTION STRATEGIES

The following sections outline a number of strategies that Kansas City, Missouri should consider for reducing GHG emissions. These strategies are drawn from successful programs and climate action plans in other communities, opportunities identified by the stakeholders involved in this project, the Kansas City Climate Protection Plan, from additional efforts in the community, and insights from the Kansas City, Missouri 2013 GHG Inventory.

Together, these strategies represent a balanced approach to reducing GHG emissions in Kansas City, Missouri. They are categorized into the following topic areas that follow Figure 7 in a clockwise manner:

Table 1. List of Recommended Strategies

Energy Efficiency	■ Advance Energy Efficiency in Existing Buildings ■ Energy Efficiency in New Construction
Energy Supply	■ Utility Scale Clean Energy ■ Distributed Renewable Energy
Transportation	■ Smart Growth and Development ■ Alternative Transportation Programs and Infrastructure ■ Alternative Fuels and Vehicles ■ CAFE Standards
Other	■ Land Use/Sequestration - Urban Forest ■ Develop a Comprehensive Solid Waste Management Plan ■ Education & Public Relations ■ Local Food

These strategies provide Kansas City, Missouri a foundation for reducing GHG emissions and for more comprehensive climate action planning in the future. The chart below illustrates the relative contribution of each strategy towards an overall emissions reduction of 3.7 million $MTCO_2e$ by 2020.

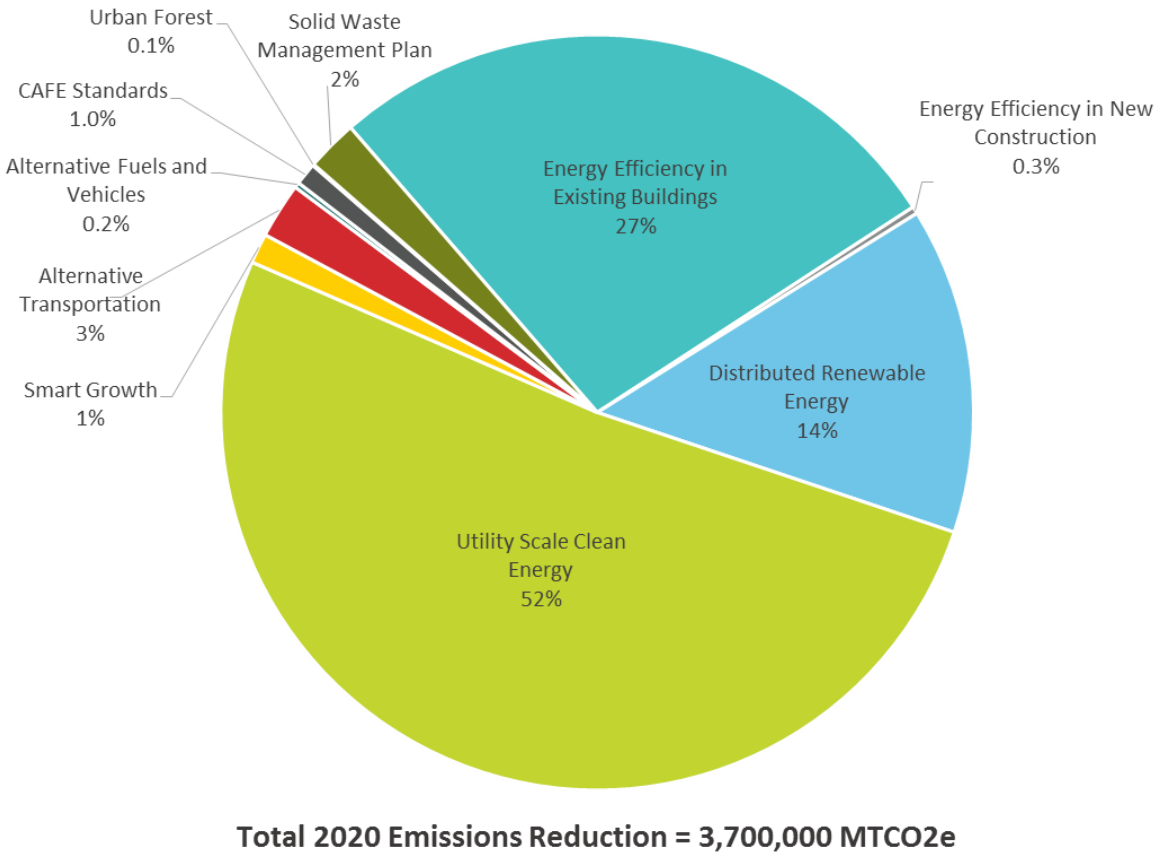
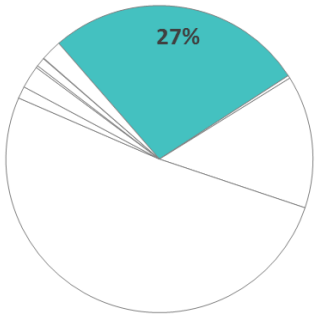


Figure 7. Emissions Reductions by Strategy - 2020

4.1 Advance Energy Efficiency in Existing Buildings

Description: Build upon existing programs to continue to improve the efficiency of the community's existing building stock with a target of 50 percent reduction in energy use by buildings participating in the program.



With aggressive education and outreach the target is to reach 48 percent of existing building space in the next five years. This strategy assumes aggressive targets leading to 2020 in order to meet goals, going after the oldest building stock and making significant improvements and then decreasing the annual targets to capture the remaining existing buildings by 2038.

Focus Area: Energy Efficiency

Implementation Tactics: Potential tactics to consider in implementing this strategy include the following:

- Support existing programs and policies to retrofit commercial and residential buildings.
- Expand programs to identify all buildings for which primary retrofit upgrades including improved lighting, increased insulation, air sealing, programmable thermostats and re-commissioning heating and cooling equipment, are practical.
- Expand programs to look at typically more expensive deep energy retrofits combined with financing to include such measures as heating and cooling system replacements, window replacements, envelope issues, and appliance replacements.
- Encourage contractors to leverage utility incentives to expand their services and reach more customers.
- Property assessed clean energy (PACE) financing for residential energy efficiency upgrades and renewable energy installations paid back through a property tax assessment.
- White roof campaign to support local builders and building owners installing white and reflective roofs.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can act as a great launching off point for this strategy, including:

- **City Energy Project (CEP):** CEP uses energy use benchmarking as a cornerstone that can help entities compare year-to-year energy use and compare one building's energy use with another. One of the goals of the CEP is to increase the number of ENERGY STAR® rated buildings in Kansas City. The KC-CEP is unique in

its initial partnership that includes the City, KCP&L, and the Greater Kansas City Chamber of Commerce.

- **EnergyWorks KC:** This ARRA-funded initiative was employed to leverage various efforts in the city including the Metropolitan Energy Center, a relationship with the William J. Clinton Foundation in support of Home Energy Affordability Loan (HEAL), and the City Energy Project, the Home Weatherization Program, the Energy Data Accelerator, and workforce development in the green jobs market.
- **Home Weatherization Program:** Provides weatherization services to low-income residents who own or rent their homes making their homes more comfortable, safe and energy efficient. Services include air sealing, attic and wall insulation installation, duct sealing, and furnace inspections.
- **Home Energy Affordability Loan:** The HEAL Program is the nation's first employer-sponsored energy efficiency loan program and is the only national model that marries quality of life - as an employee benefit program - with corporate environmental responsibility.
- **Greater Kansas City Chamber of Commerce - Energy Initiative:** This companion program to the City Energy Project and to the Mayor's Energy Challenge, which will provide resources to Chamber members to help them increase their energy efficiency as a way to save money, create local jobs, mitigate climate change and improve the resiliency of our community to the impacts of future extreme weather events. The Kansas City Energy Initiative will also support the City Energy Project in its efforts to create healthier and more prosperous American cities by improving the energy efficiency of buildings.
- **Missouri Clean Energy District** is a PACE financing mechanism using a property tax assessment to help fund renewable energy and energy efficiency projects for commercial buildings in Missouri; Kansas City is an eligible member.
- **Enterprise Sustainability Platform (ESP):** ESP provides real-time information for operating buildings in the most efficient and cost-effective way. Thermostats, fan speeds, outside air sensors, gauges, pumps and various utility submeters are tracked and continuously adjusted to eliminate spikes in energy usage and quickly diagnose problems.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including the following:

- Complete the remaining conversion of traffic signals to lower wattage LEDs.
- Work with KCP&L to enable capture of the energy cost savings of higher efficiency street lights.
- Install white roofs (cool roofs) on City buildings.
- Create case studies for city funded construction projects. This will create a list of best practices for the community to follow.

- Publicize City projects that achieve green building certifications and other recognition for design and planning.
- Build upon the current Energy Manager position to establish an Energy Office.
- Expand the use of performance contracting to retrofit all practical City buildings.

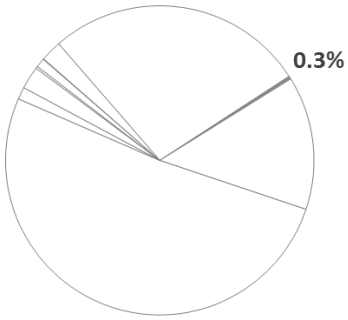
Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 1 million $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $340 million and an annual cost savings of $180 million by 2020. By midcentury, the annual emissions savings would increase to 1.7 million $MTCO_2e$, increasing annual cost savings to $850 million. Though this strategy would have a cumulative net cost of $430 per unit of GHG emission reduced in the next five years, by 2050 a cumulative net savings of $260 per $MTCO_2e$ reduced would be realized. The overall cost effectiveness of this measure by 2050 is rated as high relative to the other strategies considered in this road map.

Year	**Emissions Reduction Potential ($MTCO_2e$)**	**Annual Implementation Cost**	**Annual Cost Savings**
2020	1 million	$340 million	$180 million
2050	1.7 million	none*	$850 million

*100 percent of existing building stock would be retrofitted by 2038

4.2 Energy Efficiency in New Construction



Description: Increase efficiency in all new buildings by improving energy efficiency ordinances and codes, encouraging green and white roofs, policy changes promoting construction of green buildings, and development of green infrastructure.

The target in the next five years is to have all new construction and major renovation developed to a standard 35 percent more efficient than the current IECC 2012 code.

Focus Area: Energy Efficiency

Implementation Tactics: Potential tactics to consider in implementing this strategy include the following:

- Developing a long-term program that will incentivize green building practices in new construction projects.
- Developing incentives such as expedited permitting and density bonuses and should be given to projects that exceed existing building code requirements by a pre-determined percentage.

Existing Programs to Build Upon: There are a number of programs already taking place in the community and the region that can act as a great launching off point for this strategy, including:

- **KCP&L Rebate Program:** KCP&L offers a rebate program for residential and commercial customers which promotes both prescriptive and custom energy efficient upgrades in new construction. Improvements include lighting upgrades, more efficient heating and cooling equipment, and efficient motors and drives.
- **LEED Gold Standards for New City Buildings:** Also requires City-funded housing projects to meet ENERGY STAR standards.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including the following:

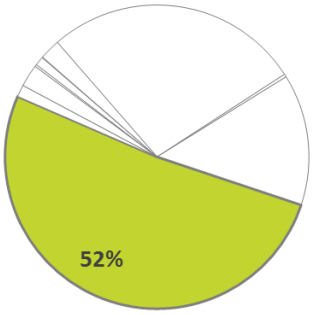
- Install white roofs (cool roofs) on new City buildings.
- Require City funded projects to achieve a certain Energy Use Intensity (EUI) measured in kBTUs/SF per building type similar to ENERGY STAR and require energy modeling to demonstrate anticipated performance in the design phase.
- Conduct design charrettes for all City building projects that include new construction or major renovation to ensure a collaborative and cohesive approach.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 11,000 $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $5 million and an annual cost savings of $1.6 million by 2020. By midcentury, the annual emissions savings would increase to 76,000 $MTCO_2e$, increasing annual cost savings to $6.8 million. Though this strategy would have a cumulative net cost of $710 per $MTCO_2e$ reduced in the next five years, by 2050 implementation would produce a cumulative net savings of $26 per $MTCO_2e$. The overall cost effectiveness of this measure by 2050 is rated as low relative to the other strategies considered in this road map.

Year	Emissions Reduction Potential ($MTCO_2e$)	Annual Implementation Cost	Annual Cost Savings
2020	11,000	$5 million	$1.6 million
2050	76,000	$1.2 million	$6.8 million

4.3 Utility Scale Clean Energy



Description: Engage local utilities to increase adoption of renewable and clean energy options into their energy supply portfolio.

This strategy is by far the largest contributor to emissions reduction potential for the community due to the significant portion of GHG emissions resulting from electricity consumption. In the next five years the assumption driving the potential impact of this strategy is implementation of the EPA's Clean Power Plan which targets a 35 percent reduction in emissions from power plants by 2030, as compared to a 2012 baseline.

Focus Area: Energy Supply

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Engagement at the federal level to encourage adoption and increasing the thresholds of the EPA Clean Power Plan.
- Engagement with KCP&L to encourage continued increased adoption of clean energy as part of the energy supply mix.
- Join current efforts to establish state policy supportive of GHG emission reduction strategies.
- Identify strategies that can help keep KPC&L relevant in an era of rapid utility model evolution including increased investment in more future-proof energy supplies such as solar and wind.

Existing Programs to Build Upon: The EPA Clean Power Plan, existing renewable energy projects implemented by KCP&L, and Missouri's Comprehensive State Energy Plan are significant leverage points to continue advancing this strategy.

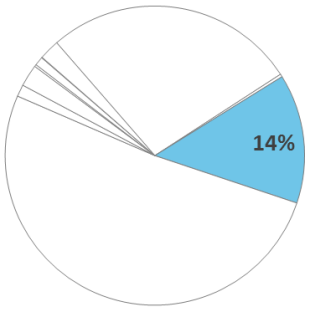
Leading by Example in City Operations: To show leadership under this strategy, the City could take on initiatives, including:

- Purchase 15 percent of the total electricity demand of the City to operate municipal buildings and facilities from renewable power sources. The City's Climate Protection Plan currently has a target of 5 percent.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 1.9 million $MTCO_2e$ in emissions savings as a result of this strategy. By midcentury, the annual emissions savings would increase to 3.6 million $MTCO_2e$. Because this strategy is external to direct activity in the community a cost benefit analysis has not been conducted.

4.4 Distributed Renewable Energy



Description: Reach greater penetration of distributed renewable energy resources by developing new economically feasible renewable energy models, developing funding sources for sustainable renewable energy projects, and promoting local, state and federal policies that encourage renewable energy.

To achieve the emissions reductions outlined here, almost 11 percent of the community's electricity demand would need to be supplied through distributed solar or other renewables in the next five years.

Focus Area: Energy Supply

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Rooftop solar program to encourage residents and businesses to install solar.
- Support development of community solar gardens and utility owned distributed solar.
- Bulk purchase program for reducing the cost of solar installations.
- New construction requirements/incentives for installing solar and solar ready buildings.
- Property assessed clean energy (PACE) financing for residential energy efficiency upgrades and renewable energy installation paid back through a property tax assessment. This type of program appears to already exist for the commercial sector (see: http://www.mced.mo.gov/).
- Integrated utility services to support and finance solar installations.

Existing Programs to Build Upon: There are a number of programs already underway in the City and the region that can act as launching off points for this strategy, including:

- **Kansas City Community Gardens** is a nonprofit that promotes urban gardens, both on private property and at schoolyards and other community sites. Consider expanding to also provide community solar options.
- **Missouri Clean Energy District** is a PACE financing mechanism using a property tax assessment to help fund renewable energy and energy efficiency projects for commercial buildings in Missouri; Kansas City is an eligible member.
- **KCP&L Solar Power Rebate** is a program for solar photovoltaic installations offered by Kansas City Power & Light that offers rebates that ratchet down until 2020, when the program is scheduled to end.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including:

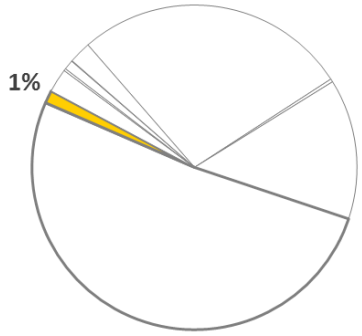
- Build upon and leverage the more than 60 solar panel systems and three wind turbines on the rooftops of City-owned structures including various parking garages, museums, police and fire stations, community centers, park shelters, a tow lot building, City Hall, three Water Services buildings and the Health Department office building. Total generating capacity in 2015 will be approximately 1.6 MW.
- Undertake a follow-up feasibility study for and implement additional opportunities for onsite generation of renewable energy for municipal buildings and facilities.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 510,000 $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $230 million and an annual cost savings of $180 million by 2020. By midcentury, the annual emissions savings would increase to 2.5 million $MTCO_2e$, increasing annual cost savings to $240 million. Though this strategy would have a cumulative net cost of $630 per unit of GHG emission reduced in the next five years, by 2050 a cumulative net savings of $16 per $MTCO_2e$ reduced would be realized. The overall cost effectiveness of this measure is rated as high by 2050 relative to the other strategies considered in this road map.

Year	**Emissions Reduction Potential ($MTCO_2e$)**	**Annual Implementation Cost**	**Annual Cost Savings**
2020	510,000	$230 million	$79 million
2050	2.5 million	$68 million	$240 million

4.5 Smart Growth and Development



Description: Follow sound smart growth principles by promoting and incentivizing development patterns that support alternative modes of transportation and limit sprawl; implement "Complete Streets" policies that consider all modes of transportation (including transit, pedestrians and bicyclists) in street design and repair; and develop a seamless regional transit system.

Through this strategy, the intent is to reduce vehicle miles travelled in Kansas City by 3 percent in the next five years. Building more compact development patterns also enables more efficient use of energy and allows for a greater level of services to be provided through a concentration in population.

Focus Area: Transportation

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Parking requirements and pricing to encourage use of alternative modes.
- Requirements for bicycle/pedestrian access in new construction and redevelopment areas.
- Revisiting building and zoning codes to permit increased mixed-use development and density where desired.
- Using tax financing mechanisms such as Business Improvement Districts, Tax Increment Financing, and Metropolitan Districts to capture the benefits of increased utilization in an area and invest back in the public realm and/or major services for that area.
- Increased transit infrastructure and service levels.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can act as a great launching off point for this strategy, including:

- **Alternative Modes of Transportation:** The City now has 29 lane miles of bike lanes, 9 lane miles of shared lane markings (e.g. "sharrows") and 63 miles of trails, part of a 600-lane-mile bikeway system.
- **Livable Streets Resolution:** Adopted by the Mayor and City Council in 2011 the resolution directs all departments to make streets more accessible for pedestrians, cyclists, and transit riders.
- **Kansas City Land Bank:** A new program that receives foreclosed houses and blighted lots and offers them at discounted rates to responsible owners. Some

properties will be fixed up for residential use and others will be used for community gardens or acquired by adjoining landowners.

- **Green Neighborhood Recognition:** A program launched in 2013 by the **KC Green Initiative**, comprised of four City staff teams that promote social equity, economic vitality and environmental quality at City facilities and throughout the community.
- **Cisco's Smart+Connected Communities:** A program that facilitates smart city pilots such as smart street lighting and environment and infrastructure sensing.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including:

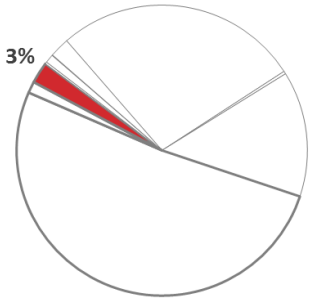
- Expand initial streetcar system as part of a healthy overall public transit system.
- Promote and incentivize development patterns that support alternative modes of transportation and avoid sprawl through use of codes, permits and tax incentives.
- Assess, in advance, the climate impact of proposed development projects as a criterion in evaluating requests for City support.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 47,000 $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $9.7 million and an annual cost savings of $15 million by 2020. By midcentury, the annual emissions savings would increase to 224,000 $MTCO_2e$, increasing annual cost savings to $34 million. Though this strategy would have a cumulative net cost of $11 per unit of GHG emission reduced in the next five years, by 2050 a cumulative net savings of $153 per $MTCO_2e$ reduced would be realized. The overall cost effectiveness of this measure is rated as moderate by 2050 relative to the other strategies considered in this road map.

Year	Emissions Reduction Potential ($MTCO_2e$)	Annual Implementation Cost	Annual Cost Savings
2020	47,000	$9.7 million	$15 million
2050	224,000	$3 million	$34 million

4.6 Alternative Transportation Programs and Infrastructure



Description: Encourage the use of public transit, carpools, biking, walking, and telecommuting as well as other approaches and infrastructure to reduce vehicle miles traveled in the City.

Through various programs and infrastructure improvements, the target would be to reduce total vehicle miles traveled in the community almost 8 percent by 2020. Each additional option of transportation offered enables a greater likelihood of being able to live without a personal vehicle, making a major contribution to emissions reductions and increasing the social component of sustainability.

Focus Area: Transportation

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Parking requirements and pricing to encourage use of alternative modes.
- Requirements for bicycle/pedestrian access in new construction and redevelopment areas.
- Innovative work scheduling.
- Increased transit infrastructure and level of service.
- Adding more shared vehicle options to the city center, making them easy to use and expanding as possible including car shares and bike shares.
- Focusing on "last-mile" solutions to provide finer grained connections from major transit stops to encourage transit utilization.
- Working on resolutions to enable a greater use of ridesharing services by explicitly allowing pick-up zones and other enabling regulations.
- Providing "guaranteed ride home" options to help address transit anxiety.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can act as a great launching off point for this strategy, including:

- **Alternative Modes of Transportation:** The City now has 29 lane miles of bike lanes, 9 lane miles of shared lane markings (e.g. "sharrows") and 63 miles of trails, part of a 600-lane-mile bikeway system.
- **Livable Streets Resolution:** Adopted by the Mayor and City Council in 2011 the resolution directs all departments to make streets more accessible for pedestrians, cyclists and transit riders.

- **Streetcar:** A new project coming online 2015 that will provide service from City Market to Crown Center, to operated by Kansas City Transportation Authority.
- **Bus Passes:** Kansas City has partnered with local transit providers to provide access to transit using City employee ID cards.
- **Route Optimization:** Kansas City uses information-based technology systems to ensure that snow plows and solid waste collection vehicles are as efficient as possible.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including:

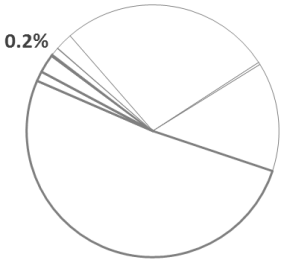
- Encouraging the use of alternative transportation modes by City employees through programs such as department competitions.
- Implementation of route optimization technology for additional City fleet vehicles.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 87,000 $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $42 million and an annual cost savings of $28 million by 2020. By midcentury, the annual emissions savings would increase to 423,000 $MTCO_2e$, increasing annual cost savings to $65 million. Though this strategy would have a cumulative net cost of $530 per $MTCO_2e$ in the next five years, by 2050 a cumulative net savings of $90 per $MTCO_2e$ reduced would be realized. The overall cost effectiveness of this measure is rated as moderate by 2050 relative to the other strategies considered in this road map.

Year	Emissions Reduction Potential ($MTCO_2e$)	Annual Implementation Cost	Annual Cost Savings
2020	87,000	$42 million	$28 million
2050	423,000	$9.6 million	$65 million

4.7 Alternative Fuels and Vehicles



Description: Expand the use of alternative fuels and reduce overall fuel consumption in the community through smart travel planning and efficient vehicle purchases.

The emissions reductions realized by this strategy assume that in the next five years, 11 percent of all new vehicle purchases in Kansas City will alternatively fueled or "best-in-class" fuel efficiency.

Focus Area: Transportation

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Identify additional opportunities to install electric car charging stations in areas that are currently underserved.
- Expand locations of Compressed Natural Gas (CNG) fueling stations.
- Develop a program to reduce the use of polluting lawnmowers, including municipal, general and commercial use.
- Additional anti-idling campaigns and regulations.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can act as a great launching off point for this strategy, including:

- **Operation Green Light:** New timing plans, special communications equipment and software have improved traffic flow and reduced fuel usage at 684 intersections, including 203 in Kansas City.
- **Idling Reduction Regulations:** Kansas City regulates the idling time limits of heavy-duty diesel vehicles in the Kansas City area and is looking at more comprehensive regulations city-wide. In addition, guidelines are in place for public vehicle fleets.
- **Clean Cities Coalition:** The City helps sponsor the Kansas City Regional Clean Cities Coalition, to increase the number of alternative fuel vehicles. In 2010, the coalition joined **Project Get Ready** to help communities prepare for electric vehicles. One initiative, **Electrify Heartland**, is planning a network of charging stations for plug-in vehicles throughout a 14-county region in Missouri and Kansas. At the end of 2012, the initiative reported a total of 78 public charging stations in the region (40 in Missouri and 38 in Kansas) with new stations opening nearly every week.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on initiatives, including:

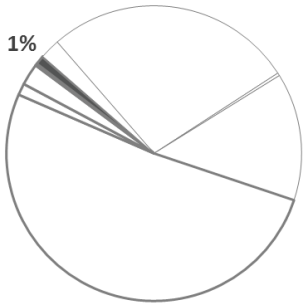
- Expand the City's alternative fuel fleet, which already is one of the largest in the country.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 8,300 $MTCO_2e$ in emissions savings as a result of this strategy, with an annual implementation cost of $1.6 million and an annual cost savings of $2.8 million by 2020. By midcentury, the annual emissions savings would increase to 23,000 $MTCO_2e$, increasing annual cost savings to $3.7 million. Though this strategy would have a cumulative net cost of $530 per $MTCO_2e$ in the next five years, by 2050 a cumulative net savings of $190 per $MTCO_2e$ reduced would be realized. The overall cost effectiveness of this measure is rated as low by 2050 relative to the other strategies considered in this road map.

Year	Emissions Reduction Potential ($MTCO_2e$)	Annual Implementation Cost	Annual Cost Savings
2020	8,300	$1.6 million	$2.8 million
2050	23,000	$190,000	$3.7 million

4.8 CAFE Standards



Description: This strategy accounts for the natural improvement of vehicle fuel efficiency due to federal Corporate Average Fuel Economy (CAFE) standards which assume the average fuel economy for new vehicles will increase to 44.2 miles per gallon by 2020.

Focus Area: Transportation

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- Engagement at the federal level to encourage adoption of aggressive fuel efficiency standards.

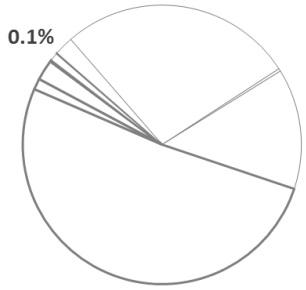
Existing Programs to Build Upon: n/a

Leading by Example in City Operations: n/a

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 35,000 $MTCO_2e$ in emissions savings as a result of this strategy. By midcentury, the annual emissions savings would be 23,000 $MTCO_2e$. Because this strategy is external to direct activity in the community as cost benefit analysis has not been conducted.

4.9 Urban Forest



Description: Preserve and enhance green spaces and trees to increase the tree canopy from 32 percent to a goal of 38 percent in the next five years for the entire community, including a tree preservation ordinance and a "trees on vacant lots" program while fighting against the Emerald Ash Borer. Urban trees provide cooling to combat the urban heat island effect, shade, and beautification as well as providing valuable ecosystem services. An example reason where trees improve climate resilience is their ability to absorb storm water in flooding events.

Focus Area: Other

Implementation Tactics: Potential tactics to consider in the implementation of this strategy include:

- If not already being implemented, the City's forestry division should coordinate activities with Kansas Forest Service's Community Forestry Program.
- Focus tree planting efforts according to the tree planting index described in *Assessing Urban Forest Effects and Values: the Greater Kansas City Region* report conducted by the United States Forest Service.
- Soil restoration to increase organics in the soil.

Existing Programs to Build Upon: There are a number of existing programs that could be built upon for this strategy.

- **Kansas Forest Service's Community Forestry Program**: The purpose of the program is to educate citizens and decision-makers about the benefits of trees, and to assist local governments, citizen groups and volunteers in the planting of healthy trees.
- **Parks and Recreation Urban Forest Programs**: The Parks and Recreation Department has reduced mowing on 400 acres of open lands, restored 300 acres of prairie lands, and protected more than 6,500 acres of woodlands.
- **Missouri Emerald Ash Borer Action Plan**: This Plan was developed by the State to address the Emerald Ash Borer through early detection and community assistance.
- **Biosolids as Fertilizer:** The City applies 5,500 dry tons of biosolids from the wastewater treatment plant as fertilizer, saving a good deal of transportation fuel and incineration emissions as well as collecting an average of $455,000 in crop income annually.

Leading by Example in City Operations: To show leadership under this strategy, the City could:

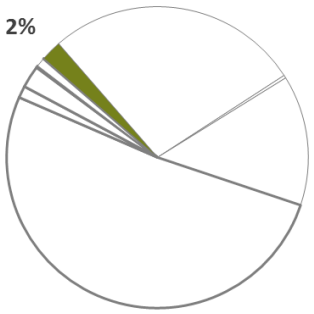
- Increase tree planting on City parks and recreation facilities.
- Implement plan to address Emerald Ash Borer issue on City parks and recreation facilities.
- Work with Kansas Forest Service to determine the best mix of trees to maximize carbon sequestration and begin planting those on City parks and recreation facilities.
- Expand the biosolids application program to include an overall soil restoration and regeneration strategy and encourage additional bacterial and microbial activity.

Cost/Benefit Analysis:

In the next 5 years, if the implementation targets are met, the City could realize 2,200 $MTCO_2e$ in emissions savings as a result of this strategy. Annual implementation cost in 2020 would be $130,000 and annual cost savings would range between $13,000 for just energy reduction and carbon sequestration to $230,000 if air quality improvements such as the removal of ozone, particulate matter, nitrogen dioxide, and other pollutants are included. By 2050, the annual emissions savings would increase to 1,300 $MTCO_2e$, increasing direct annual cost savings to $17,000 and inclusive cost savings to $71,000. The overall cost effectiveness of this measure is rated as low relative to the other strategies considered in this road map.

Year	Emissions Reduction Potential ($MTCO_2e$)	Annual Implementation Cost	Annual Cost Savings
2020	2,200	$100,000	$10,000
2050	3,000	$42,000	$3,100

4.10 Solid Waste Management



Description: Implement the City's Long-Term Solid Waste Management Strategic Plan's recommendations for achieving an 80 percent diversion rate by 2020. The plan outlines policy changes, new ordinances, collection programs, processing and transfer facilities, and disposal facilities, among a host of other strategies.

Focus Area: Other

Implementation Tactics: Tactics identified in the City's Solid Waste Management Plan include:

- Consider adopting ordinances aimed at increasing the level of recycling in the City, such as mandatory recycling for residences, multi-family units, and businesses.
- Expand education and outreach efforts to inform the public of their role and responsibility, and what opportunities are available to them.
- Expand curbside recycling using City resources.
- Consider developing an organics collection system.
- Expand City Government Recycling and Green Purchasing.
- Reorganize the Solid Waste Management Division of Public Works into a Resource Recovery Management Department.
- Consider establishing glass-only drop-off sites or expanding curbside recycling of only glass due to the demand from local industries demanding glass shard.
- Expand commercial sector recycling.

Existing Programs to Build Upon: In addition, to current Kansas City recycling efforts, the Mid-America Regional Council's Solid Waste Management District has two programs that could be built upon for this strategy.

- **Green Business:** Promotes business recycling through an award program for businesses with innovative recycling programs, green purchasing policies, waste reduction measures, and employee education programs.
- **Bridging the Gap:** Partnership with Kansas City that operates 3 recycling drop-off centers.
- **Solid Waste Management Eco-Center:** Kansas City is in the process of building a facility to make collecting trash and separating recyclables more efficient.
- **Special Events Recycling:** Kansas City currently loans recycling containers for special events and passed an ordinance requiring recycling at special events.

- **Mid-America Regional Council's Solid Waste Management District**: Provides grants to the public, private, and non-profit sectors to encourage development of local and regional waste reduction, reuse and recycling programs.
- **Demand for Glass Shard**: There are indicators that regional demand for glass shard is substantial, which provides a local market for recycled glass. The local company Ripple Glass already provides glass-only recycling services to Kansas City, which could be built upon to increase glass recycling and diversion from landfills.

Leading by Example in City Operations: To show leadership under this strategy, the City's Long-Term Solid Waste Management Strategic Plan identified the following tactics to reduce solid waste generation from City operations.

- Establish a diversion goal for municipal operations.
- Expand the City's internal recycling program.
- Establish waste reduction policies.
- Monitor compliance with existing policies and procedures for environmentally preferable purchasing and the procurement of recycled products.
- Develop new policies and implement existing policies for use of recovered materials in City projects.
- Implement best management practices for handling deicing fluids in the new airport terminal.

Cost/Benefit Analysis:

In the next five years, if the implementation targets are met, the City could realize 81,000 $MTCO_2e$ in emissions savings as a result of this strategy. By midcentury, the annual emissions savings would increase to 130,000 $MTCO_2e$. The cost benefit analysis for this strategy has not been developed as the exact strategies have not yet been decided upon.

Year	Emissions Reduction Potential	Annual Implementation Cost	Annual Cost Savings
2020	81,000	TBD	TBD
2050	130,000	TBD	TBD

4.11 Education and Public Engagement

Description: Develop a comprehensive, multi-faceted communications and public engagement plan to support the broad climate protection effort–to inform, engage and empower people, targeting business, faith communities, schools and the general public. Supporting implementation efforts by shifting focus to match needs and desires can affect progress in strategies and keep momentum. A focus on energy savings and connecting consumers to resources to help motivate actions will enable significant emissions reductions.

Focus Area: Other

Implementation Tactics: Potential tactics to consider in implementing this strategy include the following:

- Work with local schools to develop and implement programs targeting emerging citizens to meet long term strategic goals.
- Publicize and involve the community in the climate planning process as well as implementation of emission reduction strategies.
- Seek to piggyback and build upon awareness efforts from other partners to leverage their activities and have greater cumulative impact.
- Reduce transportation-related GHG emissions at area schools while teaching sustainability.
- Develop and implement a community-wide, public and professional education initiative about energy efficiency and renewable energy options.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can help encourage efforts related to this strategy, many of which are listed appropriately in other strategies. Some examples include:

- **Green Business:** Promotes business recycling through an award program for businesses with innovative recycling programs, green purchasing policies, waste reduction measures, and employee education programs.
- **Green Neighborhood Recognition Program:** Launched in 2013 by the **KC Green Initiative**, the program is comprised of four City staff teams that promote social equity, economic vitality and environmental quality at City facilities and throughout the community.
- **Heartland Local Government Sustainability Network**: City staff share experiences and best practices with other local government sustainability staff in Missouri, Kansas, Iowa, Nebraska, Oklahoma and North Dakota.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including the following:

- Initiate a well-planned public education and marketing program to broadly present the need for transportation alternatives.
- Develop and implement a community-wide, public and professional education initiative about energy efficiency and renewable energy options.
- Combine health related programs with emissions benefits such as programs that encourage use of stairs rather than elevators, also recognizing the energy savings.
- Highlight one department's efforts to reduce GHG emissions with each release of any internal publications.
- Provide significant prizes for participation and excellence in challenge programs such as those mentioned above.
- Regularly publish and/or provide online tracking of progress towards emissions reductions goals with specific tips on how City employees can make a difference.

Cost/Benefit Analysis: This strategy is not currently quantified.

4.12 Local Food

Description: Encourage healthy eating and urban agriculture by promoting residential neighborhood food production as well as metropolitan food production to reduce the impacts of transporting foods to the local community. Because the GHG emissions associated with food are predominantly associated with the production aspect rather than transportation or final delivery of food, the effects of this strategy will be minor in terms of GHG emissions reductions but will have a net positive effect on the local economy and overall community health and wellness.

Focus Area: Other

Implementation Tactics: Potential tactics to consider in implementing this strategy include the following:

- Supporting food hubs that encourage large institutional buyers to connect with and purchase products from local producers.
- Encouraging new food processing facilities for local produce.
- Supporting new and existing farmers' markets, community gardens, and mobile fruit and vegetable trucks.
- Adopting additional zoning ordinances that are supportive of urban agricultural production.
- Educating consumers about foods in season and leverage local farm directory as a resource for seasonal produce.

Existing Programs to Build Upon: There are a number of programs already taking place in the City and the region that can help encourage efforts related to this strategy, including the following:

- **Kansas City Food Circle:** An established organization, the Food Circle promotes developing a permanently sustainable local food system through initiatives, such as its annual Eat Local Campaign and Eat Local and Organic Dining Cards.
- **Kansas City Land Bank:** A new program that receives foreclosed houses and blighted lots and offers them at discounted rates to responsible owners, enabling some blighted to be repurposed as community gardens.
- **City Zoning Changes:** In 2010, zoning changes allowed fresh produce to be sold anywhere in the City.
- **Food Hubs:** This is an effort by the City to help local growers connect with and sell to large buyers, such as school districts and hospitals.
- **KC Grow:** Water Services assists urban gardening practitioners with access to water.
- **Cultivate Kansas City:** A nonprofit that promotes local food production and consumption, continues to work with City staff, elected officials and community

leaders on urban agriculture issues after zoning and development codes were successfully updated in 2010.

- **Greater KC Food Policy Coalition:** A regional alliance with the goal of encouraging a healthy food system.
- **Kansas City Community Gardens:** A nonprofit that promotes urban gardens, both on private property and at schoolyards and other community sites.

Leading by Example in City Operations: To show leadership under this strategy, the City could take on various initiatives, including the following:

- Continuing to enact policy that enables rather than hinders local producers and encourages back-yard, neighborhood, and community gardens.
- Establishing a channel (on its website) for education and outreach related to local food seasonality, production, access, and nutrition.
- Considering access to farmers' markets when planning transit routes to increase access.

Cost/Benefit Analysis: This strategy is not currently quantified.

5 SUMMARY AND NEXT STEPS

This Climate Action Roadmap builds on the completed GHG Inventory to demonstrate current emissions, and then provides a series of strategies to attempt to reach established goals. The strategies illustrate an ambitious level of action in order to demonstrate what compliance with the City's goal to reduce emissions 30 percent by 2020 would look like. This roadmap is meant to start the discussion in each focus area and to help the City and the community begin a dialogue on how they might reach the goals for both 2020 and 2050.

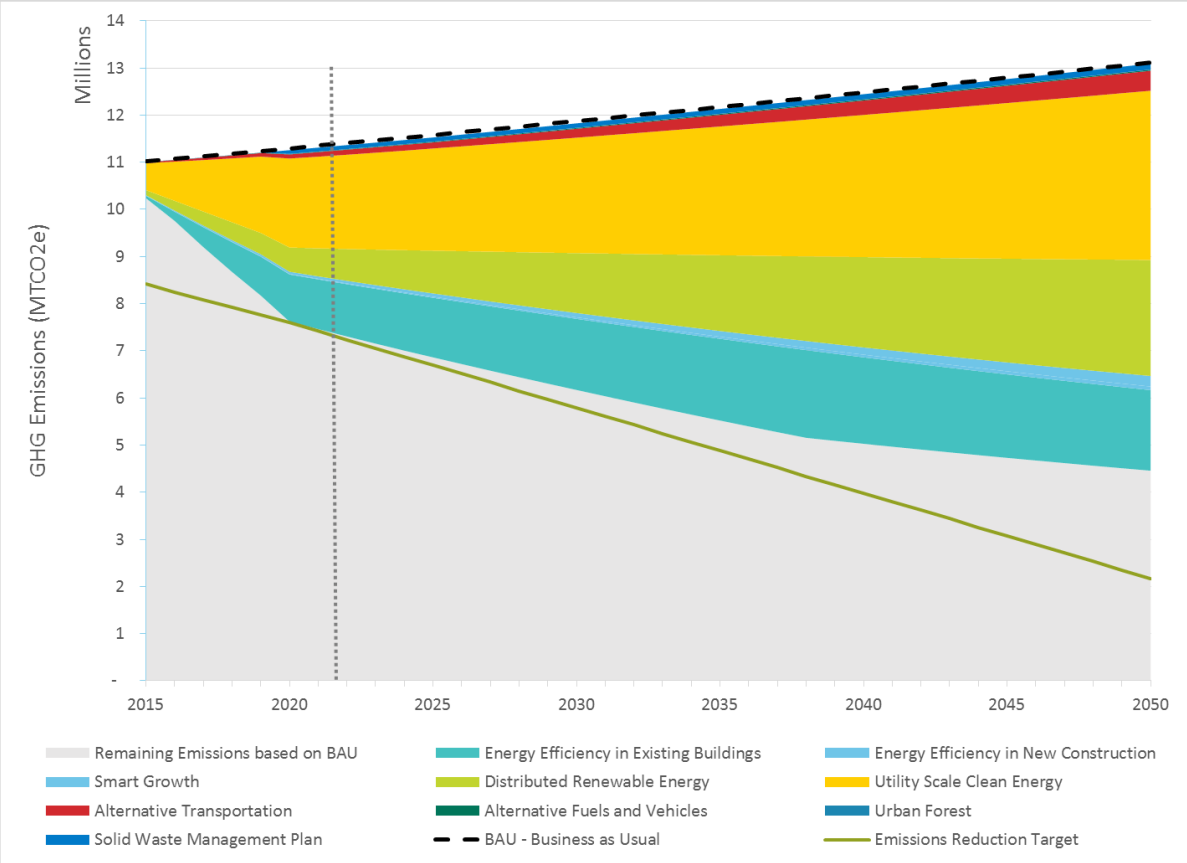


Figure 8. Future Emissions Diagram with Recommended Strategies

As shown in the figure above, the roadmap reduction strategies shown are able to support achievement of the 2020 target of a 30 percent reduction from 2000 baseline emissions. The strategies also make significant headway toward archiving the 80 percent reduction by 2050 goal. As the City uses this roadmap to develop a more comprehensive Climate Action Plan, the intent is that additional strategies would be identified to fill the 2050 gap. Additionally, as time progresses, new technologies and approaches to climate reduction will also help the City drive closer to its 2050 goal.

In order to realize the full benefits of this roadmap, as well as to determine where City resources can best be allocated, the proposed strategies need to be vetted internally across the municipal organization and externally with community residents and stakeholders. Following that process, the next recommended step would be to develop detailed implementation plans for each topic area and strategy. A more in-depth Climate Action Plan would assist in the development of tracking mechanisms, refinement of strategies in order to address resource availability, and prioritization of implementation tactics. By focusing on specific strategies in more detail, further analysis could be conducted in terms of indirect effects beyond emissions and direct cost savings. This would assist in strategic decision making, and would provide defensible information to support implementation efforts.

Kansas City, Missouri has set an ambitious course for making a significant difference in mitigating its climate impacts. In order to reach the goals identified, there is a need for bold action and leadership. The long term view of these efforts demonstrates not only a payback in terms of environmental benefits and social strengthening, but also in economic returns. Sorting through the recommended strategies will help guide the City as the tough decisions are made in regards to allocating resources and setting priorities.